City of Loma Linda
Official Report

COUNCIL AGENDA: January 10, 2006

TO: City Council

SUBJECT: Presentation by Wilson & Company relating to Railroad Quiet Zones

AGENDA ITEM 3

WILSON &COMPANY

DESIGN MEMORANDUM

CITY OF LOMA LINDA QUIET ZONE
PRELIMINARY FEASIBILITY EVALUATION
PREPARED FOR
CITY OF LOMA LINDA, CALIFORNIA

WILSON & COMPANY, INCORPORATED, ENGINEERS & ARCHITECTS

JANUARY 4, 2006

Summary:

Wilson and Company, Incorporated (WilsonCo) is pleased to submit to the City of Loma Linda (City) this Design Memorandum to discuss feasibility of establishing of a Quiet Zone (QZ) in light of the Federal Railroad Administration (FRA) regulations. This study focuses on two crossings: the Whittier Avenue and Beaumont Avenue at-grade highway-railroad crossings located within the City.

Wilson & Company reviewed the FRA's Quiet Zone Calculator Risk Index results and conclusions of Supplemental Safety Measures (SSM) scenarios of the Quiet Zone Calculator for the referenced at-grade crossings. Should the City decide to establish a quiet zone at the referenced at-grade crossings, based on the FRA's Quiet Zone Calculator, it should consider upgrading the existing two-quadrant gate railroad warning system to a four-quadrant gate system at each at-grade crossing.

Discussion:

1. Project Location and Description

The referenced crossing are located at 1) Whittier Avenue (Railroad Milepost 544.50, and U. S. Department of Transportation Crossing Number 747174M), and 2) Beaumont Avenue (Railroad Milepost 545.50, and U. S. Department of Transportation Crossing Number 747218K). The rail line is owned and operated by the Union Pacific Railroad Company. The specific rail line designation is the Yuma Subdivision main line. Amtrak operates passenger train service on this line.

The crossings are located within the jurisdictional boundaries of the City for whom this Design Memorandum is being provided.

The Whittier Avenue crossing consists of 2 traffic lanes crossing a double-track main line. Existing railroad warning devices at the crossing include two Standard No. 9

automatic gate-type signals (California Public Utilities Commission (CPUC) General Order 75-C.).

The Beaumont Avenue crossing consists of 2 traffic lanes crossing a single-track main line. Existing railroad warning devices at the crossing include two curbside mounted Standard No. 9 automatic gate-type signals (CPUC General Order 75-C).

2. Establishment of a New Quiet Zone

According to the Federal Railroad Administration's (FRA) April 27, 2005 ruling, to create a new Quiet Zone, it must be at least ½-mile in length along the railroad tracks. The crossings must have flashing lights and gates in place at each public crossing proposed for the quiet zone.

The FRA provides its Quiet Zone Calculator, a web-based tool, to help determine whether the Quiet Zone Risk Index (QZRI) of the proposed Quiet Zone is less than or equal to the National Significant Risk Threshold (NSRT). The QZRI is the average Risk Index for all public crossings in a proposed quiet zone taking into consideration the increase risk caused by the absence of train horns and any decrease in risk attributable to the use of Supplemental Safety Measures (SSM), engineering improvements which when installed at highway-rail crossing within a quiet zone would reduce the risk of a collision at the crossing. The NSRT is the average Risk Index of all public, gated highway-rail grade crossings in the nation at which train horns are routinely sounded. Risk Index is defined to be the predicted cost to society of casualties that are expected to result from collision at an individual crossing.

Based on current conditions of the crossings in the proposed QZ if the Calculator reveals that the QZRI is less than or equal to the NSRT, a QZ could be established through public authority designation. However, if based on the current conditions the proposed crossings do not qualify for QZ, the local agency must implement SSM, close crossings or construct grade separation at enough location such that the QZRI is reduced to the level of risk that would exist if the train horns were still sounded (RIWH), or to or below the NSRT.

3. Quiet Zone Calculator Scenarios

By this Design Memorandum, WilsonCo provides its report detailing its in-house review of the FRA Quiet Zone Calculator results, and analysis in context of the proposed crossings configurations. The input values used to determine whether the current crossings conditions qualify for a QZ are as shown below:

Whittier Avenue Crossing

Present Warning Devices	Gates
Number of highway vehicles per day	1,182
Number of trains per day	45
Number of trains per day during daylight	25
Number of main tracks	2
Highway paved	Yes
Maximum timetable speed (mph)	60
Number of highway lanes	2
Number of years 's accident data	5
Number of accidents in accident data years	0

Beaumont Avenue Crossing

Present Warning Devices	Gates
Number of highway vehicles per day	1,053
Number of trains per day	45
Number of trains per day during daylight	25
Number of main tracks	2
Highway paved	Yes
Maximum timetable speed (mph)	60
Number of highway lanes	2
Number of years 's accident data	5
Number of accidents in accident data years	0

The QZ Calculator result, shown in the table below, indicates that under the current conditions, a proposed quiet zone at the Whittier Avenue and Beaumont Avenue crossings corridor does not qualify for a quiet zone.

	NSRT	RIWH	QZRI
Whittier/Beaumont Corridor	17,030	20,708.33	34,541.49

WilsonCo ran the SSM scenarios under the QZ Calculator to determine the type of authorized SSMs that might qualify the crossings for a quiet zone. In this preliminary study, WilsonCo applied similar SSMs at both crossings for each scenario. The results are shown in the table below:

SSM	Corridor Quiet Zone Risk Index
None	34,541.49
Four-Quadrant Gates Upgrade from Two-Quadrant gates, No Vehicle Presence Detection	6,217.47
Four-Quad Gates with medians but no Vehicle Presence Detection	2,763.32
Four-Quadrant Gates with Vehicle Presence Detection	7,944.54
Four-Quadrant Gates, with Medians and Vehicle Presence Detection	2,763.32
Mountable medians with Reflective Traffic Channelization Devices	8,635.37
Non-Traverseable Curb Medians with or without Channelization Devices	6,908.30

4. SSM Recommendations

As the above table illustrates, given the authorized SSMs available, the one with the lowest QZRI number is to upgrade the existing railroad warning devices at the crossings from a two-quadrant gate system to a four-quadrant gate system with median and with or without vehicle presence detection.

WilsonCo includes in this Design Memorandum pictorial representations of the four-quadrant gate system super-imposed on the image of the existing conditions at the Whittier Avenue and Beaumont Avenue crossings. Also included is the four-quadrant gate system crossing plan-designs. Lastly, WilsonCo also provides an animation to give the City an idea of how a four-quadrant gate system would operate at one of the crossings.

According to the Union Pacific Railroad Company, the cost estimate to upgrade the existing crossing warning devices to a four-quadrant gate system ranges from $300,000 to $500,000 per crossing plus other associated costs such as annual maintenance[1]. This cost estimate includes installation of the exit gates, an exit gate management system and a vehicle detection system. Table 1 provides a summary of cost components.

[1] Reference UP's website at: http://www.uprr.com/newsinfo/horn.shtml#3

Should the City wish to widen either roadway from 2 to 4 lanes, this will impact the requirements for automatic warning devices. As a general design guideline, each traffic lane must have its own flashing light signal, either above the roadway or beside the traveled way. In the case of a four-lane roadway (that is, two lanes in each direction) the inside lanes can be accommodated with either median-mounted signals or cantilevered signals. Medians are generally more desirable if adequate roadway right-of-way is available. Medians allow an added measure of safety to discourage gate runaround. Median length should be a minimum of 100-feet where practicable. UPRR requires a minimum width of 10-feet adjacent to the signal. Medians may be tapered to 3- or 4-feet if required.

Where a median is not practicable due to right-of-way constraints, the inside lanes can be accommodated with cantilevered signals. Cantilevered signals are more costly than mast-mounted signals. Cantilevered signals can alleviate sight distance constraints; however, the two subject crossings do not pose such constraints.

WilsonCo also performed the QZ Calculator analysis of implementing a 4-quad gate SSM at the Whittier Avenue crossing and closing the Beaumont Avenue crossing. The QZRI for this scenario is 1407.20. If the City were able to close a crossing, this would be the least costly and lowest risk scenario.

Although the other two SSMs, "Non-Traversable Curb Medians with or without Channelization Devices" and "Mountable medians with Reflective Traffic Channelization Devices", also provide the QZRI numbers that would qualify the corridor as Quiet Zone and is also less costly than a 4-quadrant gate system, WilsonCo recommends that the City consider these two options only as its last resort. WilsonCo's reasoning is described below.

First, City is likely to be held liable for implementing the no train-horn condition should a train-vehicle or train-pedestrian collision occur at the crossing. Thus, WilsonCo recommends that the City upgrade the existing railroad warning devices at the said crossing from a two-quadrant gate system to a four-quadrant gate system to provide the maximum currently available railroad warning system to the motoring public and to pedestrians. The exit-gates of the 4-quadrant gate system would be design to descend after the entry-gates to preclude vehicles from being trapped between the gates.

Second, although federal rule preempts state rule on the train horn issue, the California Public Utilities Commission maintains its grade crossing regulatory safety oversight. The City must file a CPUC General Order 88-B application to request CPUC authorization to make modifications at a crossing. CPUC will reject the City's application if it is not in agreement with the proposed crossing enhancements for the implementation of a quiet zone. Additionally, the CPUC requires that the City obtain a concurrence letter from the railroad as part of the G. O. 88-B application submittal. The railroad may object to the proposed enhancements. However, in the event of a disagreement, the City may file a formal CPUC application. The matter would then be set forth for a formal hearing before a CPUC Administrative Law Judge. The CPUC formal hearing process could take up to 18 months for a decision.

As an alternative to implementing SSMs, City may wish to consider installing an automated Wayside horn train activated warning system at the proposed crossings. The Wayside Horn is a stationary horn system activated by the railroad-highway grade crossing warning system in lieu of a train horn warning. The Wayside Horn warning sound is concentrated in the immediate area of the crossing thereby reducing train horn noise in the surrounding area. The tone modules in the Wayside horns were digitally recorded from an actual locomotive horn.

The City of Riverside, California conducted a Wayside Horn Study at several crossings in its city. It is WilsonCo's understanding that the City received complaints from residents living immediately adjacent to the crossings. The residents indicated that the Wayside Horn appears to have increased the noise level compared to that of the train horn. This make sense since the Wayside Horn warning is now concentrated at the immediate crossing area. WilsonCo recommends that the City take this factor into consideration should it decide to install a Wayside Horn at the proposed crossings.

Should the City decide to upgrade to a 4-quadrant gate system to implement a quiet zone at the proposed crossings, as additional item to consider is the need for a vehicle detection system.

A vehicle detection system monitors the presence of a vehicle in the crossing dynamic area to delay the descent of the exit gate. This reduces the chance of a vehicle being trapped between the entrance and exit gates.

6. Next Steps

Should the City decide to pursue a quiet zone at the referenced crossings, the following steps are recommended:

1. Submit a Notice of Intent to Create a Quiet Zone to affected parties. Parties will have 60 days to comment.
2. Conduct diagnostic team meeting with the CPUC and UP during this comments period to secure agreement on the proposed SSMs for the crossings.
3. Obtain project concurrence letter from UP and submit a Commission General Order 88-B application to the CPUC requesting authorization to install the diagnostic team agreed upon SSMs for the referenced crossings.
4. Once CPUC provides approval, install the SSMs at the two crossings.
5. Update the FRA Crossings Inventory.
6. Provide Notice of Quiet Zone Establishment to affected parties in accordance with FRA Rule Section 222.43.
7. Install required signage at each crossing in accordance with FRA Rule Sections 222.25, 222.27 and 222.35.
8. Silence the horns.
9. Send affirmation and updated crossing inventory forms to FRA every 4 ½ to 5 years.

7. Schedule

The total time from Notice of Intent to Silencing of the Horns is approximately 18 months. This includes time for CPUC applications, equipment procurement and installation. This schedule presumes that all stakeholders – including the UPRR, CPUC and FRA – are in agreement with the proposed SSM recommendations and that the CPUC accepts a G.O. 88-B application rather than a "formal" application.

8. Exhibits

Figures 1 and 2 provide a pictorial representation of the 4-quadrant gates system SSM recommendation. Figure 1a and 1b show the existing and recommended SSM renderings super-imposed on the image conditions at the Whittier Avenue crossing. Figure 2a and 2b show the existing and recommended SSM renderings super-imposed on the image conditions at the Beaumont Avenue crossing. Figure 3a and Figure 3b provides a plan view sketch of the crossing with the 4-quadrant gate SSM recommendation for the Whittier Avenue and Beaumont Avenue crossings. Additionally, WilsonCo will include its electronic version of this report an animation of a how a 4-quad gate system might operate at the Whittier Avenue crossing.